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ABSTRACT

This issue discusses changes in standards, assessments, and graduation requirements needed in K-12 and higher education, examining whether high school graduates are adequately prepared to enter college without remediation. Currently, about three-quarters of high school graduates will attend college. Among students who take the recommended number of core courses, many do not take the right courses to be prepared for college. Some see the standards movement as a way to unite excellence and equity. Successful examples from New York, Maryland, and Massachusetts are presented. This issue also presents a statement of state education CEOs drafted during a meeting of education leaders from seven states. It discusses the current situation of education, their goals and commitment, and accountability. Another article emphasizes the need to align assessments, describing an analysis of various high school tests used for admissions to postsecondary institutions. Results show that with the exception of a few states that have used tests as tools to raise standards, most assessments are inconsistent and not aligned with standards. A final article presents actions for communities and states when rethinking high school graduation standards, including: communities need clear information on the content of tests required for graduation and on skills and knowledge expected of entering first-year college students; high school students should be required to complete rigorous college-preparatory courses; eliminate redundancies and mixed messages in assessments. (SM)

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TICKET TO NOWHERE: THE GAP BETWEEN LEAVING HIGH SCHOOL AND ENTERING COLLEGE AND HIGH-PERFORMANCE JOBS

THINKING K-16
VOLUME 3, ISSUE 2, FALL 1999

The Education Trust

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Thinking K-16

Vol. 3, Issue 2 A Publication of The Education Trust Fall 1999

TICKET TO NOWHERE

The Gap Between Leaving High School and Entering College and High-Performance Jobs

DEAR READER: EACH FALL, THOUSANDS of high school graduates and their parents are shattered to learn that the high school diploma they collected the previous June is not quite what they thought it would be. Instead of a ticket to college or work, that diploma is, at best, a ticket...back to high school.

Many of these students may, indeed, have been *admitted* to college. But they scored so low on the college's placement examination that they wound up in remedial courses. Others may have found employment, but wound up either in a dead-end job or in one of the thousands of on-the-job classes to master the basic skills that they should have developed in high school. And, contrary to popular mythology, this is not a problem limited to the graduates of decaying urban school districts who enter four-year colleges. As a recent Washington Post report pointed out, even in wealthy suburban school districts like Montgomery County, Maryland, many of the graduates who enter the local community college end up in remedial courses.

This issue of Thinking K-16 focuses on the changes we need to make in *both* higher education and K-12—in our standards, our assessments, and our graduation requirements—to turn this pattern around.

Our conclusion that current requirements ask way too little of high school students (and their teachers) may at first seem to put us at odds with some of our readers. Many of you are worried about getting your students to existing standards; the last thing you want to hear is that those standards are too low.

Before we begin, then, let us be clear about three matters:

- First, we are deeply aware that getting the signals straight—that is, the standards and assessments right—is only one small step toward our goal of improving student achievement and closing the gap between groups. Fixing the tests and other requirements, in other words, will not by itself fix the problem. Teachers and administrators will need lots of help in replacing outdated and low-level

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curricula, in burnishing their own knowledge and skills, and in rethinking instruction and school organization. We believe, however, that thinking of standards in a "K-16" way lays a critically important foundation for the remaining pieces of the work. For that work will undoubtedly require change in the way that higher education does business, too.

Thinking of standards in a "K-16" way lays a critically important foundation for the work.

- Second, we are acutely aware that the young people on whom we are most focused as an organization—poor students and students of color—are more likely than others to fall short of any standard of academic achievement. Traditionally, of course, most advocates for such children have shied away from high standards and high stakes and many will inevitably see this as a risky strategy. But we have spent years fighting to convince educators serving poor and minority children to replace watered-down curricula with something much better. We have concluded that the only way to banish courses like our current favorite, "Fractions without Denominators," to the junk heap of days gone by is to remove, once and for all, continued permission to divide students into "collegebound" and "non college bound" tracks with different standards for each group. In our view, closing the achievement gap depends on educating all students as if they were bound for college *and* the workplace.
- Finally, through our work exploring and documenting inequities within the education system, we know that it will be much harder for many schools and districts serving concentrations of poor and minority children to get their students to high-level standards than for schools serving students with every advantage. In many of the former schools, the curriculum has slipped to very low levels, instructional materials are insufficient and out of date, and teachers are more likely to be undereducated in the subjects they are teaching. Yet this challenge must strengthen our resolve, not sap our courage. We know that these students can achieve these high standards. Our job as a nation is to make sure they get an education calibrated to achieve that end. By focusing the energies of both K-12 and higher education, and by putting the needs of these schools first, we can close the gap, once and for all.

Kati Haycock
Director

We are grateful to the Knight Foundation for their support in producing this issue of Thinking K-16, which reports on a joint project of the Education Trust and the National Association of System Heads.

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The Education Trust, Inc.
1725 K Street, N.W., Suite 200
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Fax: 202-293-2605
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Contributing editors:
Kati Haycock, Patte Barth, Ruth Mitchell and Amy Wilkins of the Education Trust and Jan Somerville of National Association of System Heads.

The Education Trust was created to promote high academic achievement for all students at all levels, kindergarten through college. While we know that all institutions could better serve their students, our work focuses on the schools and colleges most often left behind in efforts to improve education: those serving Latino, African American, Native American and low-income students.

The Education Trust works alongside policymakers, parent, education professionals, and community and business leaders, in districts across the country, who are tying to transform their schools and colleges into institutions that genuinely serve all students.

Thinking K-16 is published with the intent to share lessons learned in these communities with policymakers as well as with educators and members of the public concerned with the quality of education provided our neediest young people.

TICKET TO NOWHERE

"*ALL STUDENTS MEETING HIGH STANDARDS*" HAS become a mantra for those of us concerned with quality and equity in American education. But unless we seize this moment—the moment in which state education leaders are turning their attention, finally, beyond K-8 to high school standards, curriculum guidelines, assessments and graduation requirements—the phrase will become yet another scrap of shopworn education reform rhetoric. For without consistent and concerted pressure, the relevant commissions and committees are likely to yield up soft answers to the most fundamental question of all: *How high is high enough?*

STANDARDS THAT MATTER

We are hardly the first to point out the need for state standards to be rigorous if they are to drive real, rather than superficial, changes in curriculum, instruction and school organization. The Council for Basic Education, Achieve, and the American Federation of Teachers, among others, have all pressed long and hard for high standards. But definitions of rigor, it seems, often vary from reviewer to reviewer, and from region to region, leaving state residents without a reliable yardstick to evaluate whether state standards and the policy framework based on them are good enough.

Our nation is no longer well served by an education system that prepares a few to attend college to develop their minds for learned pursuits while the rest are expected only to build their muscles for useful labor. In the twenty-first century, all *students must meet higher achievement standards in elementary, secondary, and postsecondary schools and thus be better prepared for the challenges of work and citizenship.*

Excerpt from a statement signed by: State Education CEOs from California, Georgia, Illinois, Kentucky, Maryland, Massachusetts, Missouri, Nebraska, Nevada, New York, North Carolina, Oregon, Texas, Vermont, and West Virginia

see page 10

This issue of Thinking K-16 puts forward what might have seemed, even a decade ago, to be a preposterous idea: that for today's needs and tomorrow's needs, the most dependable measure of whether standards are good enough may well be the simplest one of all—will the students who meet the state's new requirements for high school graduation be prepared to enter college without remediation, should they choose to do so?

STANDARDS AS THE LINCHPIN IN A K-16 SYSTEM

Most states did not, of course, approach their original standards-setting task with the goal of college readiness in mind. Their work was guided not by statements from college faculty of what first-year students should know and be able to do or even by the notion that high school graduation was for most students but a way station on the journey toward further education. Rather, standards development in most states was guided by documents from national disciplinary bodies listing what was most important in their disciplines and by equivalent documents on important workplace skills. Throughout all these documents, and the state standards based on them, there is an assumption—sometimes explicit, sometimes only implied—of college for some, jobs for others.

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This dichotomy is woven deeply into the fabric of our educational system. However, the education community seems to be among the last to cling to it. American young people and their parents have rejected the notion of "college for some" outright. They know that to secure a foothold in the emerging economy, they will need at least some college education. And young people, with encouragement and support from their parents, are signing on to get that education at unprecedented rates.

COLLEGE ATTENDANCE SOARING

Currently about three-quarters of high school graduates will go to college within two years of graduation.[1] If present growth rates continue, more than 80% of today's sixth graders will end up in college.[2]

But unless the secondary school experience of these young sixth graders differs radically from that of the students who preceded them, many of them will arrive utterly unprepared for college-level work and will spend their first year or more taking high school level courses.

Nearly half of all college students take at least one remedial course.[†][3] A full one third of the freshmen won't make it to their sophomore year[4] and fewer than half will complete a degree. Among minority students, remediation rates are even higher and completion rates are even lower.[5]

This problem occurs not for the reasons that most Americans seem to think—that these students are somehow not smart enough for college or that they didn't work hard enough in high school. Rather, it often occurs simply because the K-12 system remains mired in a previous era, educating only some kids as if they are bound for college, while the majority are assigned to a "vocational" or "general" curriculum.

BLAME ENOUGH TO GO AROUND

It is easy to point a finger of blame at American high schools for continuing to operate a two- (or even three-) track system more appropriate for the Industrial Era than the Information Age. If three-quarters of current high school seniors—and even more of their younger siblings—will be going on to college, why *aren't* high schools making sure these students complete a curriculum and meet standards that prepare them for success in college? Moreover, since report after report from business leaders insists that business needs workers with the same skills that higher education wants its freshmen to have,[6] how can there be any excuse for not teaching *all* students to those standards?

Looked at from the high school perspective, however, these messages are far from clear. Higher education may say that it is critically important for entering students to have mastered certain knowledge and skills, but colleges continue to admit huge numbers of students who haven't mastered them. In addition, colleges don't agree among themselves about the exact nature of needed knowledge and skills, and consequently, where high school ends and "college-level" work actually begins.

The business community is no better. Organizations like the Business Roundtable and National Alliance of Business may urge schools to focus on high-level reading, writing, mathematics and analytic skills. But members of the local Chamber are as likely to stress the importance of things like punctuality, courtesy, teamwork, and basic reading and math skills.

These mixed messages confuse not only educators but the public more generally. They also give high schools just the permission they need to continue operating in the same old ways.

PROGRESS, BUT NOT NEARLY ENOUGH

As a nation, we have been nibbling away at this problem for nearly twenty years. Since the release of

† For the purposes of this discussion, we assume that "admission without remediation" means at least mastery of Algebra 2 because this course is most commonly required by postsecondary institutions for placement into credit-bearing mathematics. "Remediation" in higher education does not have a consistent definition, particularly in mathematics. Some highly selective institutions require calculus as entry-level knowledge; anything less is "remedial." Other institutions treat college algebra as the entry level with intermediate algebra, or Algebra 2, as the first remedial course. Many community colleges assign college credit to intermediate algebra and consider "developmental mathematics" remedial. Another complication is that one level of mathematics may suffice for admission and placement into college credit mathematics, but may not be enough for entry to quantitative majors like mathematics or physics.

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A Nation at Risk, ever increasing numbers of high school graduates—rich and poor, minority and white—have completed the core academic curriculum recommended in that report. This so-called "New Basics" curriculum includes four years of English, three years each of mathematics, science and social studies, and one-half year of computer science, but does not specify the content of these courses.[7] The result is that even among those who do complete the recommended *number* of core units, many are not taking the right courses—those that prepare students for college. And, in truth, the courses that pass for "college prep" in some schools are but watered down versions of similarly named courses in other schools.

If we are going to break this pattern, we need levers to bring about change faster and more substantially than ever before. That's where the new high school standards, assessments and accountability systems based on them come in.

STATES GETTING OUT OF LINE

Some of us see the standards movement as a way to finally unite the concepts of excellence and equity—a way to end, once and for all, the myopic practice of sorting students from the earliest grades into the "college bound" and the rest. For standards to succeed, however, they must not only have the qualities normally set forth by the standards gurus, including clarity, parsimony and the like. They and the assessments based on them must also be unyielding in their rigor. In other words, they must faithfully and firmly represent the knowledge and skills necessary to begin work at the next educational level. Just as eighth grade standards should be designed to assure that students are ready for high school, so, too, should high school standards assure readiness for college.

Over the last two years, a group of K-12 and higher education chief executives who share this same conviction have been working together to forge a new path. They are devising or revising their state standards and assessments to tightly link high school completion with college readiness (see "With Renewed Hope—And Determination" beginning page 10). The education CEOs' commitment received heavy reinforcement at the 1999 National Education Summit where the attending governors and corporate CEOs agreed "to align higher education admission standards with new high school graduation standards and reduce or phase out remediation at four-year institutions."[8]

While the work in the leading states is by no means complete, it provides some images of how to fit the standards, the assessments and the graduation requirements into a K-16 system that will promote achievement and rigor for all. From their work to date, we know that there is no one right way to approach this issue. Rather, there are a variety of ways that can be tailored to the climate, politics and educational traditions of each state.

NEW YORK

New York is perhaps the furthest along of all. Drawing heavily on their long experience with rigorous Regents' Examinations, state education leaders decided that the best thing they could do to raise standards for high school students was to extend the Regents' examination and curriculum system to all students instead of offering it to just the elites as before. Beginning with the graduating class of 2000, students will have to pass Regents' Examinations in English language arts and mathematics in order to graduate from high school. In subsequent years, they will have to pass examinations in other subjects to gain that diploma.

What is critically important about these exams is that they were developed with the explicit goal of measuring much of the same knowledge and skills measured by college admissions and placement exams. Students who passed the English examination, for example, should be ready to move directly into credit-bearing courses in college. And higher education seems to concur. After reviewing these examinations, the Trustees of the City University of New York agreed in the summer of 1999 to use students' Regents' English language arts results (albeit with a somewhat higher cut score than is required for high school graduation) in place of their own placement tests. A similar decision is expected from the State University of New York.

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MARYLAND

In Maryland, faculty representatives from both K-12 and higher education came together within disciplines to agree on what students needed to know at the boundary of high school and college. Now, leaders in both K-12 and the university system of Maryland are working on the development of assessments that will also be rigorous enough to be used both for high school graduation and to inform the admission and placement process. The goal is to assure that all Maryland high school graduates have the skills and knowledge they need to begin college-level work should they choose to do so.

MASSACHUSETTS

Massachusetts provides yet another example, especially in English language arts. Indeed, in a development unimaginable even a few short years ago, English faculty across two- and four-year colleges recently ended their search for a first-ever statewide writing placement test by deciding that the best available option was the new state high school graduation assessment![9]

Students in the above states—as well as in Oregon, Texas, Florida and several other states that are moving in this direction—are very fortunate. In place of the usual mixed signals from K-12, higher education and business, a single set of clear signals is beginning to emerge about what is important for students to be able to do, and what is not. There will be no surprises.

Unfortunately, most states are not nearly so clear about what is expected of high school graduates and first-year college students (see page 16 for a content analysis of commonly used K-12 and college tests). In these states, students who know everything they need to know to pass the state K-12 tests can fall quite short on college examinations and end up spending valuable college time learning what they could, and should, have learned in high school.

COURSE REQUIREMENTS

The same mismatch we see in high school and college testing is evident when you compare course requirements for high school graduation to courses needed for university admission in the same state. The tables on pages 14-15 show that some states—Oklahoma and Tennessee, for example—are at least beginning to line the two up, thereby increasing the chance that all high school graduates will be prepared for college-level work.

In most states, however, there is no such alignment. In mathematics, the typical state requires graduates to complete two or three years of mathematics, but the content of those courses is not specified. Students who meet (or even exceed) their mathematics requirement with Algebra 1, Geometry, and Algebra 2 have no problem because those courses fulfill the minimum mathematics requirement for most universities (and the minimum that even two-year colleges require for credit-bearing coursework). But for the student who completes the three-year requirement with "Math of Money," "Consumer Math," and "Review of Arithmetic" (real courses, we kid you not), a nightmare is ahead. They may well have met the state's requirements, but they are decidedly NOT ready for college.

Mathematics isn't the only problem area. In science, most universities insist on three years, including at least two years of laboratory science; for high school graduation, though, most states require not even a single lab course. English language arts (ELA) courses are typically required by both systems for all four years of high school. But even though ELA course titles vary little, the content of these courses can differ a lot. Students who satisfy ELA requirements with literature courses that involve lots of writing are unquestionably better prepared than the students whose English classes involve almost no writing at all. (In our own classroom work, we have run into more than a few high school English courses where students actually draw more than write.)

In Asia and in most European countries, both students and parents would view similar discrepancies as wholly unacceptable, for access to postsecondary education—and, often, even graduation from high school—is dependent upon performance on rigorous high school exit examinations.[10] In the U.S., though, the mere existence of a system of "second chance" open door institutions has made people far more

willing to tolerate slack in the high school curriculum. If they don't learn it in high school, goes the logic, they can always come back and learn it in a community college.

But such thinking begs many questions, not the least of which is, "Why should they have to?" More to the point, it ignores the present reality of community colleges. Far from the "standard-less" institutions that they are often believed to be, community colleges have lots of standards. Admission to their more competitive programs (nursing, physical therapy, and the like) is often *more* difficult than gaining admission to a nearby four-year college. Moreover, students seeking entry into less selective programs may be admitted to the college as a whole with only three years of jump-over-the-box math, but before they even register for their first class they must take a placement test that requires them to have skills at the Algebra 2 level or beyond. Yes, even those who don't pass the placement examinations can enter, but will they ever graduate? Not if they need more than one or two remedial courses.[11]

What students are required to take in high school turns out to have decisive, long-term implications for their futures. Indeed, recent research conducted by Clifford Adelman at the U.S. Department of Education makes the extent of those implications painfully clear. "Among all of the factors in college success," he says, "the single most important by far is the quality and intensity of the high school curriculum."[12]

MOVING FORWARD IN COMMUNITIES AND STATES

As we said in the beginning, this is a moment for all of those who care about excellence and equity to join in the conversation about the goals of high school, and the standards, assessments and graduation requirements that will support those goals. Depending on local history and culture, communities may not come to an immediate agreement that all kids should be prepared for college. But they might get such agreement for today's sixth graders or, perhaps, for today's first graders.

Conversations on this subject can be hard, especially among educators across the two systems. Some people worry that, no matter what K-12 agrees to, higher education will want more. Our recent experiences with such conversations, however, cause us to be more optimistic. Faculty in both systems are dispirited about underperformance and, in the interest of greater clarity for students and teachers, seem far more eager than before to come to consensus.

In any event, the conversation is worth having. At the very least, states and communities should be able to build the bridges between higher education and K-12 faculty that are necessary to pull the two sets of standards closer together, providing a firm foundation to close the gap later on.

This report looks at various aspects of the high school to college gap, including:

- Relevant data on college going and college preparation;
- A statement from leading K-12 and university system CEOs on the importance of assuring that all high school graduates have the skills they need to succeed in college;
- A state-by-state comparison of high school graduation requirements and university admissions requirements;
- A comparison of the content in selected K-12 and college tests; and,
- Recommendations for steps that states and communities can take to close the gap between high school and college expectations.

The alignment of our two education systems is overdue. But it is not too late to begin. We hope that states and communities will launch a K-16 conversation immediately, with the goal of sending a single, coherent message to students, teachers and parents about the knowledge and skills America's youth need for a secure future. This way a high school diploma can truly be a ticket to somewhere.

WHO MOVES ACROSS SYSTEMS
What the Data Show

72% Of High School Seniors In 1992 Went On To Postsecondary Within Two Years of Leaving High School

22% entered two-year colleges
43% entered four-year colleges
7% entered other postsecondary institutions

NCES Condition of Education, 1997, U.S. Department of Education, Washington DC, p. 64, from NELS:88 longitudinal study

Large Numbers of Them Had To Take Remedial Courses:

	All Colleges	High Minority Colleges
Reading	13%	25%
Writing	17	29
Mathematics	27	35
Reading, Writing or Mathematics	29	43

NCES Condition of Education, 1997, from Remedial Education at Higher Education Institutions in Fall 1995. p.102

Many College Freshmen Did Not Return For Sophomore Year

Four-year colleges	27%
Two-year colleges	44%

Mortenson, "Freshman-to-Sophomore Persistence Rates by Institutional Control, Academic Selectivity and Dgree Level, 1983 to 1998," Postsecondary Opportunity, Number 74 (Oskaloosa IA: August 1998)

Students Who Required Extensive Remediation Graduated From College At Lower Rates

	Earned BA
No remedial courses	54%
One remedial course	45
Three remedial courses	18
More than two semesters of reading	9

Adelman, Clifi In National Crosstalk, Vol. 6, No. 3, Summer 1998, National Center for Public Policy and Higher Education, San Jose CA

1992 College Freshmen Who Graduated Within Six Years

	Earned BA
African American	37%
Asian	68
Latino	48
Native American	37
White	59
Total	56%

NCAA Division I, class entering 1992, NCAA, Indianapolis, IN, 1997

Students From Low-income Families Were Less Likely To Be Enrolled In The College-preparatory Track

Low-income	28%
Middle-income	49
High-income	65

NCES, A Profile of the American High School Senior in 1992, Washington DC: US Department of Education, June 1995. p. 36

African American And Latino Students Were Also Less Likely To Be Enrolled In The College-preparatory Track

African American	43%
Asian	56
Latino	35
White	50

NCES, A Profile of the American High School Senior in 1992, Washington DC: US Department of Education, June 1995. p. 36

1992 High School Graduates Attended College in Higher Numbers Than Were Enrolled in College Preparatory Courses

Went Directly to College	72%
Completed College Prep Curriculum	47%

NCES Condition of Education, 1997, U.S. Department of Education, Washington DC, from NELS:88 longitudinal study

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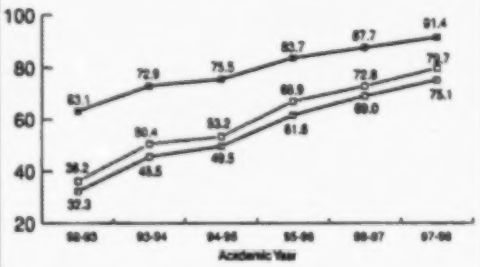
All Students Can Succeed When Placed In Rigorous Courses

More and more evidence from across the country proves that all students can meet high levels of academic performance when they are taught to high levels.

Raising Standards Can Raise All Students' Math Scores While Closing Gaps



El Paso Collaborative for Academic Excellence, El Paso, TX

Taking High-level English Courses Matters for Vocational Students

Vocational Seniors Completing:	1996	Average Reading Score*	1998	Average Reading Score*
High-Level English	28%	283	43%	292
Regular/Applied English	65%	265	56%	276
Basic English	9%	251	5%	263

*NAEP scale score

Southern Regional Education Board, High Schools That Work, 1998

TOO FEW SENIORS DEMONSTRATE STRONG ACADEMIC SKILLS:

The most recent trend data from the National Assessment of Educational Progress (NAEP) show that gaps between groups of students are still wide.

READING AT AGE 17 – NAEP 1996

	African American	Latino	White
Learn from specialized reading materials	2%	2%	8%
Understand complicated information	16	18	37
Interrelate ideas and make generalizations	49	44	42
Show partially developed skills and understanding	28	30	12

WRITING AT GRADE 11 – NAEP 1996

Effective, coherent writing	1**%	1%	3%
Complete, sufficient writing	16	18	34
Beginning focused, clear writing	53	51	51
Incomplete, vague writing	28	28	12

MATHEMATICS AT AGE 17 – NAEP 1996

Multistep problem solving and algebra	1**%	2**%	9%
Moderately complex procedures and reasoning	30	38	60
Numerical operations and beginning problem solving	60	52	30
Beginning skills and understandings	9	8	1

**interpret with caution

NAEP 1996 Trends in Academic Progress, U.S. Department of Education Office of Educational Research and Improvement, NCES 97-985, Washington DC, September 1997

A Statement of State Education CEOs, K-16

With Renewed Hope—and Determination

For several years the National Association of System Heads (NASH), with assistance from the Education Trust and financial support from the Pew Charitable Trusts, has drawn together university system and state school system CEOs for intensive, candid and action-oriented conversations about how best to improve student achievement K-12 through college. This statement was drafted during the summer 1998 meeting of education leaders from seven states. It is intended to summarize the participants' discussions and to articulate action plans for the years ahead.

THE SITUATION

From the beginning, the participants have been determined that our efforts be informed—indeed, driven—by honest assessment of the facts concerning the performance of our schools and their students. Consequently, we have carefully reviewed national data about student achievement and educational practice. From these data we conclude the following:

- Throughout our education system from kindergarten through college, and for all students, neither performance nor persistence is at levels we want and need. This is especially true for low-income and minority students, but the problem of underachievement is by no means limited to them.
- Many of our students are learning at low levels not because there is something inherently wrong with them, but because we are failing to teach all students at high levels. At all levels of education, we teach different students different things and their teachers are differently qualified. Low-income and minority students in particular are more likely to be enrolled in less challenging curricula, their teachers are more likely to be underqualified, and their schools are more likely to suffer from inadequate instructional resources. Parents and other community stakeholders too often fail to help establish and maintain supportive academic environments that make high performance by all students a realistic expectation.
- Among all these problems, the most damaging is the assignment of underqualified teachers. The difference in student performances achieved by effective and ineffective teachers is frequently large, even dramatic—as much as an extra grade level within a single school year.
- Though some would have us believe otherwise, it is very clear that we can correct these patterns *if* we can muster the will and the courage to make bold changes in the way we conduct the educational process. There is a growing number of schools and colleges around the country whose successes show what needs to be done and demonstrate that it can be done. In El Paso, Texas, for example, a five-year collaboration between higher education, K-12, and community leaders has raised academic performance for all students and reduced the minority achievement gap by about two-thirds.

A UNIVERSAL GOAL

We believe that at the core of the lessons taught by the facts of our situation is one simple idea that leads directly to a universal goal:

Our nation is no longer well served by an education system that prepares a few to attend college to develop their minds for learned pursuits while the rest are expected only to build their muscles for useful labor. In the twenty-first century, all *students must meet higher achievement standards in elementary, secondary, and post-secondary schools and thus be better prepared to meet the challenges of work and citizenship.*

The word "all" in that goal is especially important. It reflects our conviction that bringing every student to a high level of performance is both necessary and feasible. It is necessary because today's complex knowledge-dependent society and economy demand a solid foundation of basic knowledge and skills in *all* citizens. We know it is feasible because it is already being done in some schools by some teachers. Our task is to make such accomplishments the rule rather than the exception.

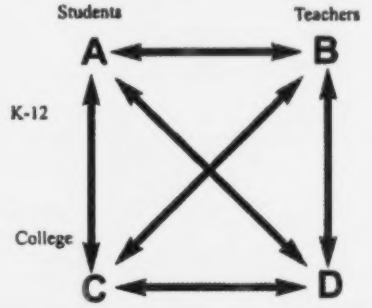
It appears that some education and political leaders lag behind America's families in their understanding of this simple idea. In survey after survey parents say that access to and success in higher education is critically important to them and their children. And their children seem to agree. Among the high school graduates of the class of '92, over 70% entered postsecondary education within two years of graduation. (Others will surely enter later.) Unfortunately, however, only about half were actually prepared for college.

By the time the students now in our elementary schools graduate from high school, college attendance will probably be near universal. We must commit ourselves to ensuring that preparation for college is equally universal, by setting high standards for all students and by ensuring that all students are placed in a competitive curriculum aligned with those standards. And our insistence on high standards must continue through college. In other words, what we have traditionally regarded as the ceiling must now become the floor.

OUR COMMITMENT

As we considered the respective roles of elementary, secondary and postsecondary institutions in moving us toward the universal goal, we became convinced that achieving the goal will require four interlocking and equally important commitments on the part of our institutions. There are two for elementary and secondary schools and two for colleges and universities. They can be represented as the corners of a figure we have dubbed "The K-16 Square."

State Systems K-16 • Summer 1999



Commitment A: We will ensure that all high school graduates meet high standards.

Commitment B: We will accept only teachers who can bring all students' performance to high standards.

Commitment C: We will accept into college only students who meet high standards.

Commitment D: We will ensure that all teacher candidates we produce are prepared to bring student performance to high standards.

These commitments demonstrate the inseparable connections among the elementary, secondary and postsecondary sectors of the education system in addressing the problem at hand. Commitments A and C, for example, imply that our K-12 sector should guarantee, by a date certain, that all of its graduates are prepared for college. They also imply that, by the same time, our colleges should cease to admit students who are not college ready. The implications of Commitments B and D are equally stark. To ensure that all K-12 students are taught by teachers well

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equipped to prepare them to meet high standards, our school systems must *cease employing* ineffective and underqualified teachers. We cannot expect students to meet high standards that their teachers themselves are unable to meet, or are underprepared to help their students meet. Similarly, colleges and universities must *cease graduating* underprepared teachers.

It should be noted that the K-16 Square reflects no intrinsic hierarchy. Any of its four commitments can be placed at the top. Rather, it represents four interconnected and equally important goals, all of them bold and ambitious but, in our opinion, absolutely achievable.

It should also be noted that strong interaction among sectors of the education system is crucial. Change in one sector cannot be accomplished without change in the others. For example, the standards for A must be made congruent with the standards for C. Likewise, the standards for D must be congruent with the standards for B. Commitments B and C are, in effect, the enforcement mechanisms for A and D.

Finally, although the K-16 Square is centered on the interface between secondary and postsecondary education, it is obvious that our commitments on both sides of that interface should be essentially the same. For example, colleges must ensure that all students meet high standards and accept only professors who can bring all student performance to high standards. What is sauce for the goose is sauce for the gander! Our conversations and commitments this year were focused on how elementary and secondary schools working together with colleges and universities can ensure that high school graduates are prepared to succeed in college. There remains the question of how both sets of institutions can work together to ensure that *college* graduates are prepared to succeed in life. That is a discussion for another time. Nevertheless, we believe that these two goals are inextricably linked, and that the commitments expressed in the K-16 Square constitute powerful first steps toward the development of very different ways of approaching teaching and learning in higher education generally.

We mentioned above "a date certain." Goals should be accompanied by timetables. We recognize that the socioeconomic and political circumstances of every state are different, and that they may change with time, sometimes suddenly and unexpectedly. We understand that each state will have to establish its own timetable for achieving the universal goal and for meeting the four commitments. We think timetables should be set soon by every engaged state. We considered what might be a reasonable time by which a significant number of states could be expected to achieve the universal goal and meet the four commitments of the K-16 Square. We concluded that perhaps a third of the states should be able to do so by the year 2010. (That is, not coincidentally, approximately the number of states represented at the NASH/Education Trust State Systems K-16 working conference following the Aspen meeting.) With the example of these leading states before them, the trailing two-thirds of the states should be able to achieve the universal goal and meet the K-16 Square commitments by 2020.

NEXT QUESTIONS

The universal goal and the four commitments we have presented here raise many questions about how we should pursue them. Each state represented at our gathering, and each state active in the larger K-16 movement, will have to define its own questions and seek its own answers to them. Nevertheless, it might be useful to list a few of the relevant questions here as we see them. For example:

- How will we decide how high is high enough? If the skills and knowledge necessary to succeed in college-level work are at least one critical benchmark, what process can we use to come to agreement across postsecondary institutions on that knowledge set?
- What do we need to do to ensure that college admissions and placement policies reinforce the K-12 standards?
- How will we decide what knowledge and skills teachers need to be able to bring their students to high standards?
- Can we be clear about our goals for students preparing to become teachers without also being clear about our goals for students preparing for other careers? Shouldn't we then establish and enforce ambitious goals for all college and university students?

• Regarding all our work, how can we avoid unilateral decisionmaking? That is, how can we make sure that higher education is not the sole arbiter of an adequate K-12 exit standard and K-12 is not the sole arbiter of adequate teacher preparation?

Answers to these questions and other questions, as well as associated timelines, will vary from state to state because our circumstances vary. Some of us are just starting down the path to standards-based reform, while others have been traveling it for many years. In some of our states postsecondary education is accepted as a goal for almost everyone, while in others that notion remains novel. Finally, and perhaps most important, some of us have already created K-16 partnerships to mount and sustain this work, while others are just now doing so.

BEING PUBLICLY ACCOUNTABLE

The agenda we have outlined here is not a private agenda shared by a few educational institutions in a few states. At least it ought not to be. It is, or ought to be, a very public agenda, a national agenda. Believing this, we agreed to add another to the four commitments of the K-16 Square. *We commit to undertake efforts during the coming year to begin a process of mustering the public support and political will and courage it will take to follow this path consistently and persistently for a decade and more!*

As we start down that path, one thing is very clear at the outset: No proper public debate and action on this agenda can occur without accurate and comprehensive information about the performance of schools, colleges, universities and their students, publicly available and widely shared. No physician can be expected to deal with a disease about which he/she knows little or nothing. We started our work with a careful look at reliable data about where we are in comparison to where we need to be in the twenty-first century. We believe that anyone who becomes engaged with this issue has an obligation to do the same. For our part, we are committed to sharing our own data in a way that will enable the communities we serve to evaluate this agenda and monitor our progress.

EPILOGUE

We do not underestimate the practical difficulties and impediments that will confront us as we strive to achieve the universal goal and to meet the commitments we have presented here. Nor do we underestimate the risks to all involved, both institutional and personal. While our dedication to achieving the goal and meeting the commitments is, for the moment, ours alone, we hope others will be moved to join us.

LIST OF SIGNATORIES:

Richard C. Atkinson, *President, University of California*
Robert Bartman, *Commissioner of Education, Missouri*
Molly Broad, *President, University of North Carolina*
William M. Bulger, *President, University of Massachusetts*
Charles I. Bunting, *Chancellor, Vermont State Colleges*
Douglas Christensen, *Commissioner of Education, Nebraska*
Wilmer S. Cody, *Commissioner, Kentucky Department of Education*
Joseph W. Cox, *Chancellor, The Oregon University System*
William H. Cunningham, *Chancellor, The University of Texas System*
Gordan K. Davies, *President, Kentucky Council on Postsecondary Education*
David Driscoll, *Commissioner of Education, Massachusetts*
Delaine Eastin, *California State Superintendent*
Mathew Goldstein, *Chancellor, City University of New York*
Nacy Grasmick, *Superintendent of Schools, Maryland*
Donald Langenberg, *Chancellor, University System of Maryland*
Charles W. Manning, *Chancellor, University System of West Virginia*
Henry R. Marockie, *State Superintendent, West Virginia Department of Education*
Glenn W. McGee, *Superintendent of Education, Illinois*
Richard Mills, *Commissioner of Education, New York*
Jane Nichols, *Vice Chancellor for Academic Affairs, University and Community College System of Nevada*
Manuel Pacheco, *President, University of Missouri*
Stephen R. Portch, *Chancellor, University System of Georgia*
Charles B. Reed, *Chancellor, California State University*
John W. Ryan, *Chancellor, State University of New York*
Keith Sanders, *Executive Director, Illinois Board of Higher Education*
Ted Sanders, *President, Southern Illinois University*
Dennis Smith, *President, University of Nebraska*
Kala M. Stroup, *Missouri Commissioner of Higher Education*
Michael Ward, *North Carolina State Superintendent*

DIPLOMAS THAT MATTER

The Need to Align Course Requirements

It doesn't take more than about a half-hour with a high school master schedule, course descriptions and the relevant state standards to conclude that some courses are much more closely aligned with the standards than others. In each of the core academic disciplines, some courses will get you there, some will get you close, and some will get you, at best, to only the standards for eighth grade, or even fourth.

Despite this fact, states have been slow to bring their course requirements for high school graduation into line with their standards. Mathematics provides perhaps the clearest example. While virtually all state standards for high school seniors include knowledge of algebra and geometry, only 13 states actually require students to take those courses (or an integrated version thereof) in order to graduate. There are similar discrepancies in other disciplines, as well.

Bringing high school graduation requirements into line with state standards is an important step. But it won't be a sufficient step for students if those standards don't line up with what higher education expects.

At the moment, almost all four-year colleges require students to complete specified courses in at least Mathematics, English/Language Arts and Science in order to be admitted. Their requirements to be placed into credit-bearing (as opposed to remedial) courses may in fact be even higher than those for admission. And the latter affect not only students bound for four-year colleges, but those bound for two-year colleges as well.

Of course, just because a course bears a certain title doesn't always mean that it teaches the right content. Sometimes the "algebra" students learn in courses with that name is a pale imitation of what colleges and businesses expect. Nor does course completion necessarily translate into student mastery of the content.

Once standards-based education has taken hold in both K-12 and higher education, we may be able to dispense with all these course requirements and focus instead on the knowledge and skills that these courses are supposed to provide. In a standards-based system, students will be able to proceed at their own pace, use a variety of instructional mediums, and move along whenever they can demonstrate proficiency. Their school day (or, for that matter, night) will no longer have to be divided into the same old 45-minute chunks, nor need their school year be divided into semesters. Then truly, learning—not seat time—will be what matters.

Until then, however, any gaps between the courses that K-12 requires for graduation and higher education requires for admission/placement can have devastating implications for students. We need a rigorous academic core curriculum for *all* students. It doesn't have to be *taught* in the same old ways, but it needs to be taught to all.

STATES	High School Graduation		College Admission*	
	Math	English	Math	English
Alabama	4 units 1 alg, 1 geom, 2 other	4 units Engl 9, 10, 11, 12	N/A	N/A
Alaska	2 units	4 units	N/A	N/A
Arizona	2 units	4 units	4 units algebra I, II; geometry; advanced (alg II or prereq)	4 units composition and literature
Arkansas	3 units alg I or applied math	4 units	4 units	4 units
California	2 units	3 units	3 units algebra, geometry intermediate algebra	4 units
Colorado	est. locally	est. locally	N/A	N/A
Connecticut	3 units	4 units	N/A	N/A
Delaware	2 units	4 units	N/A	N/A
Florida	3 units	4 units	3 units algebra I and above	4 units 3 w/ substantial writing
Georgia	3 units alg I	4 units	3 units 2 courses in algebra; 1 in geometry	4 units grammar, literature, advanced composition
Hawaii	4 units	3 units	N/A	N/A
Idaho	4 semester credits	9 semester credits	3 units algebra I, geometry (or appl math I,II), algebra II	4 units composition and literature
Illinois	2 units	3 units	3 units college prep: algebra, geometry, trigonometry	4 units communication and literature
Indiana	2 units	4 units	N/A	N/A
Iowa	est. locally	est. locally	N/A	N/A
Kansas	2 units	4 units	3 units algebra I, II and geometry	4 units substantial writing; reading seminal literature

* required by state or state system

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STATES	High School Graduation		College Admission	
	Math	English	Math	English
Kentucky	3 units alg I, geom	4 units	3 units algebra I, II and geometry	4 units English I, II, III, IV
Louisiana	3 units max of 2 intro courses	4 units	N/A	N/A
Maine	2 units	4 units	N/A	N/A
Maryland	3 units alg and geom	4 units	3 units algebra I, II and geometry	4 units
Massachusetts	est. locally	est. locally	3 units algebra I, II and geometry	4 units
Michigan	est. locally	est. locally	N/A	N/A
Minnesota	est. locally Minnesota uses proficiency than course requirements	est. locally standards rather	3 units 2 of alg (1 in intermediate or advanced); geometry	4 units composition and literature
Mississippi	3 units alg I	4 units	3 units algebra I, II and geometry	4 units with substantial communication skills
Missouri	2 units	3 units	3 units algebra I, II	4 units 2 with emphasis on composition/writing
Montana	2 units	4 units	3 units	4 units
Nebraska	est. locally	est. locally		
Nevada	2 units	4 units	3 units beyond pre algebra	4 units
New Hampshire	2 units	4 units	N/A	N/A
New Jersey	3 units	4 units	N/A	N/A
New Mexico	3 units	4 units grammer and lit	N/A	N/A
New York (CUNY)	2 units integrated math	4 units	2 units 3 recommended: algebra, geometry, trigonometry	2 units 4 recommended
New York (SUNY)			N/A	N/A
North Carolina	3 units alg I	4 units	3 units algebra I, II and geometry	4 units grammar, literature, compo.
North Dakota	2 units	4 units	3 units algebra I and above	4 units
Ohio	2 units	3 units	3 units algebra I, II and geometry	4 units
Oklahoma	3 units alg I and above	4 units grammer,comp,lit	3 units from alg I, II, geom, trig, math analysis or calculus	4 units grammar, literature, composition
Oregon	2 units	3 units	3 units algebra I, II and geometry	4 units language, literature, speaking/listening, writing
Pennsylvania	est. locally	est. locally	N/A	N/A
Rhode Island	2 units career track	4 units	3 units	4 units
South Carolina	4 units (by 2001)	4 units	3 units algebra I, II and geometry	4 units all must be coll. prep
South Dakota	2 units	4 units writing, lit, speech	3 units advanced math (alg, geom, trig, or other)	4 units grammar, literature, composition
Tennessee	3 units alg I and above	4 units Engl I, II, III, IV	3 units 2 algebra, 1 advanced math	4 units English I, II, III, IV
Texas	3 units alg I	4 units		
Utah	2 units	3 units	3 units 2 beyond elementary alg.	4 units composition and literature
Vermont	**	4 units ** combined with science	N/A	N/A
Virginia	3 units 2 in alg I and above	4 units	N/A	N/A
Washington	2 units	3 units	3 units algebra I, II, and geometry	4 units at least 3 in composition and literature
West Virginia	3 units 2 in alg I and above	4 units Engl 9, 10, 11, 12	2 units algebra I and above	4 units
Wisconsin	2 units	4 units	3 units	4 units
Wyoming	3 units	4 units	3 units	4 units

Mixed Messages

The Need to Align Assessments

Imagine you are running a race blindfolded through the streets of San Francisco. You have coaches on almost every corner, but sometimes their instructions are confusing—even contradicting those that you got a few moments back. One urges you to go straight up the upcoming hill, the next directs you around it. One yells at you to sprint the next quarter mile, while another tells you to slow down. Despite all this, you're nearing the finish line when all of a sudden a hurdle pops up out of nowhere to knock you flat. In addition to running, it seems that you also needed to learn how to jump. Nobody told you.

To too many high school students, our testing system feels just like this. Between the ages of 17 and 18, most American students will be subjected to at least three kinds of tests to measure what they learned in high school. These tests, designed for different purposes, were unfortunately also designed with little, if any, coordination. Consequently, they present quite different visions of what students should have learned.

- In high school, students take commercially available tests like the Stanford 9 or Terra Nova, and/or state-developed assessments. These tests typically are composed of relatively simple-minded reading passages and mathematics questions that cover a wide range of content, but quite thinly. Most of the skills are those taught between middle school and lower high school.
- But, unlike in other countries, these tests don't count for college admission. So most high school students will also take one or more of the tests used by colleges and universities to screen applicants. While these tests address many of the same topics as the high school assessments, they also cover content not included on the K-12 examinations (and, interestingly, overlook domains on the K-12 tests, like probability and statistics, that most college professors would undoubtedly agree are important). Even where the content is the same, the questions on the college tests tend to be much more difficult.
- Then there is what for most students is the hidden hurdle in the process: the placement tests that both two- and four-year colleges administer to place students into credit- and non-credit bearing courses (and that, in an increasing number of places, affect college admissions as well). These examinations include content not contained in either the K-12 exams OR the college admissions tests. For many students, this will be the first point at which they have to do any significant amount of writing or demonstrate the skills typically mastered in intermediate or advanced Algebra.

For students who have been well guided through the system, this barrage of uncoordinated tests is at most an irritant. If they've taken the right courses and been reasonably well taught, they will do fine on any of them.

But for many other young people, especially the poor and minority students whose schools are most likely to be teaching toward the low-level high school examinations, the incoherence in these tests can be devastating. These students will find out—too late to do anything about it—that what they and their teachers don't know about the college tests can hurt them.

IMPLICATIONS FOR EVERYBODY

The consequences of this system for students are considerable. Too many students graduate from high school with knowledge and skills sufficient to pass graduation examinations, but wholly inadequate for the college-level education that they want and need. Those students may well enter college, but they will be locked out of credit-bearing courses. They will likely find themselves locked out of high-performance jobs as well.

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METHODOLOGY

How We Studied the Tests

The study team worked through each test, categorizing the items in order to make supported generalizations about each test. The categories differed a little between English language arts and mathematics, but generally they consisted of the grade level where the topic is normally taught; the topic; how it is presented; the challenge it presents to the student; and the kind of knowledge or skill tested. These categories were used to classify all the items in the actual or sample tests in this study.

CATEGORIES

Grade level: At what point is the content typically taught and learned? We categorized in grade level bands: approximately grade 6 though 8, or middle school; grade 9 through 10, or lower high school; grade 11 through 12, upper high school; and "college ready."

Content/Topic: English language arts topics are grouped in three general areas: *reading* (comprehension, form, vocabulary and interpretation); *writing* (narrative, informative and persuasive); and *editing* (language mechanics, usage, grammar and spelling).

For mathematics, we categorized according to recognizable course names: *Algebra 1, Geometry, Algebra 2, Trigonometry/precalculus*, where possible, but also added a category for *data, probability and statistics (DPS)*, which can be taught throughout middle and high school. We also classified items as *arithmetic* and related topics such as *discrete mathematics* and *combinatorics*, which can also be found in courses throughout the secondary years. Some items fell in the middle: for example, it was sometimes hard to distinguish whether an item would be taught at the end of Algebra 1 or the beginning of Algebra 2. In these cases, we classified the item at the higher level.

Application or presentation: In English language arts, *applied* items ask test-takers to manipulate information embedded in text, for example, comprehension or editing questions based on reading passages. *Decontextualized* items are isolated from a textual context, for example, the verbal analogies in the SAT I or editing questions based on a single sentence.

In mathematics, this distinction was described as a difference in the way the problem is presented, whether numerically, symbolically, graphically or verbally. In *numeric, symbolic* or *graphical* items, the problem is presented in numbers, with mathematical symbols or in graphs. For example,

If x=2 and y=3, what is the value of this expression? $2(7x + 3y) - 8$?

Conversely, *verbal* items present a context with words, as in this example:

> At Harrison High School, 20% of the students in band are also in choir. This percent is equivalent to what fraction?

Cognitive challenge in ELA and mathematics: *Simple* means that the problem requires only one step or the application of a set procedure, for example, the recall of literal information in a given reading passage, or making a few strokes on a calculator. *Complex* means that the problem is multistep and requires the development of a strategy drawing on knowledge of more than one domain. *Moderate* is between the two, that is, the item requires at least two steps, but doesn't necessarily draw on other domains.

Kind of knowledge tests. We also looked for a balance in the "kind" of knowledge that was tested. *Recognizable* means that only recall or recognition is required to select the correct response. *Procedural* means the correct response can be produced by applying a practiced rule or algorithm. *Conceptual* requires understanding of the concept—the answer cannot be produced by procedure

alone. It implies that students must understand the concept and be able to apply it to other situations. In English language arts, this includes items that require the use of analytical skills such as inference or evaluation. In mathematics, we added a fourth category, *problemsolving*. These items require students to apply more than one concept in order to solve a problem.

The categories were organized in a matrix on which each test item was classified and recorded. Tests were tabulated according to content, with some additional comments about the presentation (verbal, symbolic, numeric, or graphic) and the kind of knowledge tested: will a simple procedure produce the answer? Does the question require understanding of a single concept? Or does the problem require a student to bring more than one concept to the solution?

The relative difficulty of an item is best understood through the combination of categories, rather than a judgment based on any single category. The following examples illustrate how one should read across categories.

This verbal item from the SAT I[1]

Select the [paired words] that best expresses a relationship similar to that expressed in the original pair.

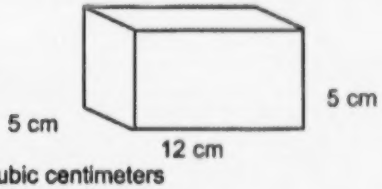
DECEPTIVE: RUSE ::
(A) grasping : greed
(B) intense : passion
(C) imperious : command
(D) cynical : belief
(E) crass : blunder

was classified in this way:

Grade level	Topic	Application	Cognitive Challenge	Kind
11-12	vocabulary	no	complex	conceptual

and this mathematics example from the TAAS high school exit examination[2]

What is the volume of the rectangular prism?



A 120 cubic centimeters
B 290 cubic centimeters
C 300 cubic centimeters
D 600 cubic centimeters

was classified in this way:

Grade level	Topic	Presentation	Cognitive Challenge	Kind
6-8	geometry	graphic	simple	procedural

[1] The College Board, "Taking the SAT I: Reasoning Program, 1997-98" Educational Testing Services: Princeton NJ, 1997, p. 46
[2] Texas Education Agency, "Texas Assessment of Academic Skills (TAAS) Exit Examination, Mathematics, Spring 1998," p. 24 from TEA web page

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But there are also serious consequences for educators and educational institutions at all levels:

- For high school teachers—especially those conscientious enough to know that the two systems want something different—the mixed messages from higher education and K-12 pull them in different directions. Some schools and districts press them to produce better scores on the high school tests, some demand high numbers for college admissions, and some want both. Yet available time often seems too short to prepare students thoroughly to the standards embedded in one test, much less to prepare them for multiple tests.
- The differences are also deadly for school officials and reform leaders trying to win public confidence. K-12 leaders in Kentucky recently found this out the hard way when their students' improved performance on state and national assessments was called into question because of widely publicized increases in the number of graduates held for remedial courses in college. (It turned out that a good part of that increase was attributable not to poor preparation, but to changes that several colleges made in their requirements.)
- Even higher education is taking its share of the lumps for K-12/higher education mismatches these days. In state after state, policymakers are threatening to ship students back to two-year colleges or cut off funding for "duplicate" education, when in fact many of "remedial" students were never taught what they needed to know to begin with.[13]

Each of the tests may once have worked reasonably well for the purpose it was originally designed to meet. But they can no longer be considered separately, especially when present college-going rates for high school graduates are close to three-quarters and climbing. As they rethink high school standards and assessments, state and local education leaders need to work toward a more coherent system across the border of K-12 and higher education.

To help states and communities as they move forward, we summarize on the following pages a recent study of the content assessed in widely used high school and college tests. This study sought to identify both commonalties and differences.

While there were many domains in common between tests at different levels, there were also significant gaps. Happily, the study found exceptions to the general pattern. New high school examinations in New York and Massachusetts were thought to yield useful information for colleges to consider for admission and placement, particularly in the area of English language arts.

THE STUDY

Over the last year, a team of subject specialists, co-sponsored by the Education Trust and National Assocation of System Heads, undertook an analysis of a selection of tests used in high school, for admissions to postsecondary institutions, and for placement in college courses. The team was led by Ruth Mitchell, a

The National Advisory Committee For the Assessment Content Analysis

Gail Burrill, past president of the National Council of Teachers of Mathematics (NCTM) and now director of the Mathematical Sciences Education Board;

Dan Jones, dean of the College of Liberal Arts, Towson University, Maryland;

Carol D. Lee, associate professor, College of Education, Northwestern University;

Jim Lewis, professor of mathematics, University of Nebraska-Lincoln.

George Pullman, associate professor of English, Georgia State University;

Lynn Arthur Steen, past president of the Mathematical Association of America (MAA) and professor at St. Olaf College, Northfield, MN;

The analysis team was led by Ruth Mitchell, principal partner for the Education Trust. Other team members are Bradford Findell, program officer, Center for Science, Mathematics, and Engineering Education at the National Research Council; and Education Trust senior associates Carlton Jordan and Patte Barth. The six members of the National Advisory Panel reviewed the work of the analysis team, reported in this section of this publication. They are not responsible for the conclusions and recommendations that the Education Trust staff have drawn from this study.

principal partner of the Education Trust, and worked with the advice of a distinguished national panel of experts in mathematics and English language arts (see "The National Advisory Committee," page 19). The analysis was limited to these two subjects because they are common to all tests.

The tests the team looked at were:[14]

High School Tests

- Stanford 9, published by Harcourt Brace Educational Measurement
- TerraNova, published by CTB/McGraw-Hill
- Massachusetts Comprehensive Assessment System (MCAS)
- New York State Regents[15]
- Kentucky Commonwealth Accountability Testing System (CATS)
- Texas Assessment of Academic Skills (TAAS)
- The National Assessment of Educational Progress (NAEP)
- The General Educational Development (GED), published by the American Council of Education

College Tests

- SAT I, published by the Educational Testing Service (ETS)
- ACT, published by ACT
- SAT II, published by ETS
- ACCUPLACER™, published by ETS
- COMPASS, published by ACT

The team focused on the academic *content* of the tests, not their psychometric qualities or their form. The purpose was to determine the knowledge and skills that students need to answer the questions on the tests, and to see if the tests send a clear, consistent message to students and teachers about what students should know and be able to do (see Methodology, page 17).

In mathematics, content is typically understood in terms of the courses students take, such as Algebra 1, Geometry, Algebra 2, Trigonometry/precalculus. But it also includes topics taught throughout the mathematics curriculum: number and number theory, data, probability and statistics.

In English language arts, content includes the kinds of reading and writing required of students and whether or not they are expected to be familiar with literary techniques and analysis.

While gaps between the content of high school and college tests were apparent in both mathematics and English language arts, the gaps took on characteristics unique to each discipline. For this reason, we discuss the discrepancies separately by subject.

ENGLISH LANGUAGE ARTS (ELA)

English began as a study of classic works of literature. But in this century, English as a discipline has come to include "reading" and "writing" more generically. It is now thought that in addition to knowledge of literature, the subject called English builds students' literacy—that is, the ability to critically comprehend texts from any discipline or genre.

This umbrella status creates room for almost endless disagreements about the skills and knowledge that should be developed in English language arts classes. Confusion about the relationship of reading and literature is especially obvious on the tests we looked at: some ask for familiarity with the traditional literary approaches (Massachusetts MCAS; New York Regents; Kentucky CATS; SAT II); others assume no literary skill or experience but only ask for skill with reading informational or academic texts (Stanford 9, TerraNova, Texas TAAS, ACT, SAT I, COMPASS, ACCUPLACER™. Vocabulary is sometimes tested in context (Stanford 9) and sometimes as an isolated skill (SAT I).

Occasionally, differences between various tests' approach to literature and reading cut across levels. Often, however the differences are *between* the high school and college exams.

THE TEST IS IN THE TEXT

Reading tests have two dimensions: the challenge of the reading passage in terms of vocabulary, the syntactic sophistication of the sentences and the subject matter itself; and the challenge of the questions asked about the passage.

The team found serious disconnects between tests in the level of content, the topics that were addressed and in the ways tests approached content. The high school tests by and large were much lower level than either the college admissions or placement examinations.

The kind of reading also varied considerably. Except for some literature, the high school tests generally featured non-academic reading passages—typically short narratives and general interest informational pieces—and addressed so-called "functional" or "document" reading of such practical day-to-day texts as tax forms, data presentations, technical instructions, etc. The admissions and placement tests had no document reading, but were primarily academic and literary in nature, modeling the kind of reading one would expect to do in college studies (see reading examples and discussion on pages 22-24).

The New York Regents' Examination in English was an exception to most of the high school tests in that it integrated sophisticated and varied reading passages with written open-response questions. A member of our national advisory, Professor George Pullman of Georgia State University, wrote: "Compared with everything else I've seen, this test is far superior. If you can pass this test, if rigorously graded, you could be ready for college. This test would drive a sea-change in the place of writing in education, because integration of reading and writing is clearly evident."

The Regents' is intended for all students. It is also designed to influence teaching. The test itself provides examples of good teaching methods, for the multiple choice questions in the first three parts act not as a trap for students, but as a scaffold to support students through their timed writing tasks. The multiple-choice questions clarify the pieces students will write about.

The Massachusetts state test, MCAS, shares the high end with the New York Regents' examination. Like the New York test, the MCAS English test ties reading and writing together, and also offers the student help through the scaffolding provided by the multiple-choice questions. It lacks a component for document or functional reading; otherwise this is a fine assessment that is worth teaching to. A student who

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The National Assessment of Educational Progress at Age 17 (grade 12)

At the same time as students are taking these tests, some of them will be asked to take a test for which they will not receive a score—the National Assessment of Educational Progress (NAEP). Although it is a matrix test with no reported results for individual students, NAEP has influence on educational policymaking because its results are reported nationally and received as a check-up on the nation's educational health. The NAEP frameworks on which the tests are based have become small-scale surrogate national standards, especially in reading and writing.

NAEP reading assesses a student's ability to read for literary experience (imaginative or narrative); to read for information (informational); and to read to perform a task (functional). At NAEP for age 17 (grade 12), 35% of the questions address reading for literary experience, 45% address reading for information, and 20% address functional prose. The NAEP reading items are taken from literature, textbooks, and manuals. The questions involve a combination of multiple-choice and short student response questions, with an emphasis on student response.

Missing from the NAEP assessment are questions that require analysis of complex, academic texts that should characterize the reading needed for college, although the reading passages themselves may be sophisticated. NAEP, like Stanford 9 and TerraNova (which have been influenced by the NAEP reading and writing frameworks), emphasizes informational and functional reading along with literary narratives. This kind of reading is lacking in admissions and placement tests. In those tests, extracts from textbooks in the content areas are the equivalent of informational reading, but functional reading—the interpretation of documents, advertisements, directions, graphs and instructions—is ignored, despite increasing evidence that college graduates aren't terribly proficient in this area.[1]

NAEP has incorporated the NCTM recommendations in its mathematics framework and in the grade 12 test. While 20% of the items are concerned with geometry and 25% with algebra, another 20% are concerned with data analysis. The NAEP test emphasizes communication and writing in mathematics by making as many items as possible "verbal" in the sense we have defined in our methodology. The questions frequently give students real-world problems to solve, such as determining whether it is better to lease or to buy a car. There is a strong reading element in this test: much of the information required to answer the questions is provided in narrative. A student's success on this NAEP test depends a great deal on how accustomed the student may be to mathematics presented verbally. None of the questions is as rigorous as it could be, given the sophistication of the item construction, as we have noted throughout our discussion of verbal items in mathematics.

[1] NCCS, Adult Literacy in America, U.S. Department of Education, Washington, DC, 1992.

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Mixed Messages

The sample questions on these center pages are representative of the different messages tests send to the same class of high school students. Most students will encounter two or more of these tests between the end of tenth grade and beginning of twelfth of high school. Even though the grade level is similar, the knowledge and skills needed to perform well varies dramatically from test to test.

MATHEMATICS

Each of the following items addresses mathematics concepts that would typically be learned in an Algebra 1 course. Most of the high school assessments in the study (represented below by the TAAS) addressed basic algebra, often on a level that students should be expected to learn in the first quarter of the course. But the ACT item below requires a far more sophisticated understanding of algebra concepts.

Another disconnect between tests had to do with the way the tests present items. The high school assessments tend to present problems verbally in realistic contexts, although the team found that the contexts were frequently contrived, adding little embellishment to otherwise straightforward mathematics. The TAAS algebra item is typical of this approach. The college admissions and placement tests, on the other hand, favor symbolic presentation, as in the ACT item. The New York Regents provides an example of an open-ended item. This problem, in the words of Gail Burrill on the advisory committee, "requires students to generate their own mathematical representation and then use it to solve the problem."

Texas Assessment of Academic Skills (TAAS) Exit Examination[1]

Carter works at a restaurant. He earns $5 per hour plus tips. During an 8-hour shift, he earned a total of $95. If t is the amount in tips that Carter earned during that 8-hour shift, which equation could be used to find t?

F $(t + 5) \cdot 8 = 95$
G **$(8 \cdot 5) + t = 95$**
H $8t + 5 = 95$
J $8 + 5 + t = 95$
K $8 \cdot 5 \cdot t = 95$

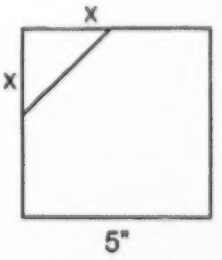
ACT[2]

For all $x > 0$, $\frac{2x^2 + 14x + 24}{x + 4}$ simplifies to:

A $x + 3$
B $x + 4$
C **$2(x + 3)$**
D $2(x + 4)$
E $2(x + 3)(x + 4)$

New York Regents Examination[3]

A corner is cut off a 5" by 5" square piece of paper, the cut is x inches from a corner as shown.



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(a) Write an equation, in terms of x, that represent the area, A, of the paper after the corner is removed.
(a) What value of x will result in an area that is 7/8 of the area of the original square piece of paper? Show how you arrived at your answer.

READING

The following passages are taken from published sample materials and are representative of the range of reading challenge different tests present. The Stanford 9, like most of the high school tests in the study, was filled with line drawings and photographs, which are not reproduced here. But it's worth noting that these visuals reveal much about the passages and questions. The Stanford 9 passage was also printed in double-spaced type. The SAT I, on the other hand, is dense with single-spaced text and there is no supplemental decoration. The design is straightforward and utilitarian.

We also feature an excerpt from the Massachusetts Comprehensive Assessment System. We have included this as a sample of a high-school English Language Arts test that features substantial literature passages with interpretive questions.

MCAS and the Stanford 9 combine multiple-choice and open written response questions; the Stanford 9 is also available in a multiple-choice only format. The SAT I is all multiple-choice.

We have excerpted the first paragraph and a sample question for each of the following reading passages. The actual passages ranged from 400-800 words in length and were followed by 8-10 questions.

Stanford 9, Grade 11/12[4]

Have you ever had days when nothing seems to go right, and then someone makes a humorous observation that makes those little crises seem funny? Cathy Guisewite, creator of the comic strip "Cathy," earns her living making humorous observations that render life's minor catastrophes easier to bear. Through her cartoon strip, she sends us the message that there's humor in almost every crisis and a bright side to every disappointment....

This article was written in order to —
A relate events from a cartoonist's childhood
B interest the reader in becoming a cartoonist
C teach a lesson about the importance of humor
D describe how one cartoonist become famous.

Open-response question:
Choose a part of the article that you think is most important. What part did you choose? Why did you choose that part?

SAT 1[5]

Directions: The passage below is followed by questions based on its content. Answer the questions on the basis of what is stated or implied in the passage and in any introductory material that may be provided.

It may be that as many as 38,000 Greenland right whales were killed in the Davis Strait fishery during the early part of the nineteenth century, largely by the British fleet. A sound estimate of the size of that population today is 200. What happened in the heyday of Arctic whaling represents in microcosm the large-scale advance of nonindigenous cultures into the Arctic. It is a disquieting reminder that the modern Arctic industries—oil, gas, and mineral extraction—might be embarked on a course as disastrously short-lived as that of the whaling industry. Our natural histories of this region 150 years later are still cursory and unintegrated. This time around, however, the element at greatest risk is not the whale but the coherent vision of the indigenous people. Only indigenous groups such as the Inuit, the Yupik, the Inupiat, and others can provide a sustained narrative of human relationships with the Arctic landscape independent of the desire to control or possess. Most nonindigenous views lack historical depth and are still largely innocent of what is obscure and subtle.

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The author discusses the nineteenth-century Arctic whaling industry in order to
A correct a misconception
B provide a warning
C reconcile two points of view
D introduce an appealing model from history
E furnish a contrast to twentieth-century Arctic industries

MCAS (Massachusetts Comprehensive Assessment System)[6]

Directions: The following selection, a chapter from *Follow Your Heart* by Susanna Tamaro, has been translated from its original Italian by John Cullen. As you read the chapter, which is actually a letter, notice how the author develops mood and characterization. When you are finished reading, answer the questions that follow.

Opicina
November 18, 1992

YOU'VE BEEN GONE for two months, and for two months I haven't heard anything from you, except for the postcard you sent to let me know you were still alive. This morning, in the garden, I stood in front of your rose for a long time. Even though we're well into fall, it's still bright red, standing out solitary and arrogant while the other plants are brown and dead. Do you remember when we planted it? You were ten years old, and you had just finished reading *The Little Prince*, a present from me for passing fifth grade. You loved that story. Of all the characters, your favorites were the rose and the fox; you didn't like the baobab tree, the snake, the aviator, or any of the empty, conceited men sitting on their minuscule planets. So one morning, while we were having breakfast, you said, "I want a rose." When I objected that we already had lots of roses, you said, "I want one that's all mine, I want to take care of it and make it grow tall." Naturally, along with the rose, you also wanted a fox. With a child's cunning you had put the simple request before the almost-impossible one. How could I refuse you a fox when I had already agreed to a rose? We discussed this point for a long time, and at last we compromised on a dog.

How does [the first] sentence introduce the theme of the letter?

A **It reflects the letter writer's emotional viewpoint.**
B It describes the setting of the story.
C It identifies the characters and their relationship.
D It provides foreshadowing of events in the story.

Open-response Question:

Although the intended recipient of this letter is never directly described, there are many clues about her and her personality. Describe the person for whom this letter is intended. Use specific examples from the selection to support your ideas.

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[1] TAAS, Exit Examination Samples, Texas Education Agency, March 1998

[2] ACT Assessment: Sample Questions: Math Set 1 www.act.org

[3] New York Regents Mathematics A Test Sampler, New York Department of Education, 1999

[4] Stanford 9, High School Level 11-12, Key Links, The Connection Between Instruction & Assessment, Reading/Language Arts, Student Booklet. Harcourt Brace & Company: San Antonio, 1996

[5] The College Board, "Taking the SAT 1: Reasoning Test" Test Preparation Material, 1997-98, College Entrance Examination Board and Educational Testing Service; Princeton NJ

[6] MCAS, "Grade 10 English Language Arts Sample Assessment Materials," Massachusetts Department of Education, February 1998

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studied for the New York and Massachusetts English tests should do well on most college tests.

THE WRITE STUFF?

The natural question is: what about *writing*? Here the silence is deafening: the most widely used tests in our study did not ask for writing at all (see "Nationally Used Tests, High School to College," page 25). When writing does appear, the messages it sends are confused.

English teaching has a tradition of writing based on the "essay," a personal reflective form practiced by Hazlitt and Oliver Wendell Holmes among others. This form has only a limited audience today, for example, in magazines like the New Yorker. However, the "essay" has left a legacy in the dominance of writing prompts on tests which have no purpose and no audience.

The following SAT II prompt is a case in point:

> "I have experienced various things that have made me feel worthwhile, but I have never felt better than when——." Assignment: Write an essay completing this statement. Be sure to explain the reasons for your choice.[16]

Who is the intended reader of this response? What message is the writer supposed to get across and why? After reading countless such vacuous prompts, our reviewers began to refer to the whole lot as "Write about your favorite piece of furniture." The writing that results from such prompts can only be evaluated by surface features such as organization, language mechanics and usage.[17] Because the response is personal reflection, the validity of the essay's content can't be judged objectively.

Like creative writing, the personal or reflective essay has a legitimate place in the English classroom. However, it should not be the only form of writing done by students or even the dominant one. It certainly should not provide the basis for decisions about college or workplace readiness.

The writing needed in college and in work is not primarily concerned with personal feelings or ruminations, but with analysis, reporting, summary, argument, persuasion. This writing is connected either to reading (textbooks, primary texts, sources, cases, and collections of data) or to observation, as in experiments. Frankly, though, you wouldn't know this from the writing asked for in most of the tests in this study. While some required such writing, others in this study request only personal narratives.[18]

NATIONALLY USED TESTS HIGH SCHOOL TO COLLEGE WRITING

	Narrative/ Personal Essay	Exposition/ Analytical	Persuasive
Terra Nova*[1]	○	n/a	n/a
Stanford 9 Multiple choice	n/a	n/a	n/a
Stanford 9 Constructed response	n/a	○	n/a
NAEP – 12th Grade	○	○	◉
GED	○	n/a	n/a
SAT I	n/a	n/a	n/a
SAT II	○	n/a	n/a
ACT	n/a	n/a	n/a
ACCUPLACER™	○	n/a	n/a
COMPASS	n/a	n/a	n/a

KEY: ○ - Simple
◐ - Moderate
◉ - Complex
n/a – Not Addressed

* The writing portion of Terra Nova is optional.
1 Analyses were based on practice or sample prompts, and not on actual tests. Interpret with caution.

The prevalence of the personal narrative in testing has its roots in a genuine problem: large-scale assessment cannot assume any body of knowledge common to students for the sake of fairness. Prompts are therefore chosen for their presumed accessibility to the widest possible population, which means that they will have as little content as possible beyond the words on the page. A second problem is based not on fact but

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on a myth—that writing can be assessed as "writing," apart from its subject or content. Yet writing, like reading, is always about something. Response, and therefore evaluation, cannot be divorced from content.

The constructed response form of the Stanford 9 and state tests such as the New York Regents, the Massachusetts MCAS, and the Kentucky CATS have partially solved the above problem by tying written responses to questions about reading passages. Kentucky goes further by requiring a writing portfolio at twelfth grade with a total of five writing entries, a minimum of two of which must come from another content area. Each portfolio must have reflective writing, personal expressive writing, transactive writing and literary writing. Writing done to complete an assignment for which the teacher is the sole audience fails to meet the requirement of real-world communication and could affect the portfolio negatively.

But even on those few tests where the writing appeared to be more purposeful, the degree of complexity demanded by the prompts was mixed. Of the few tests we examined with writing samples, only the New York Regents and MCAS showed complexity in their choice of reading passages and writing prompts (see MCAS example, page 24). Other writing assessments gave test-takers simple passages followed by relatively straightforward questions and were judged to be simple to moderately complex (see Methodology on pages 17 for definition of terms).

Meanwhile, students in many high schools write only personal and expressive narratives. Not only are they ill-prepared for the purposeful communication demanded by the workplace, they get clobbered when faced with an analysis or comparison of two major ideas in, let's say, an introductory sociology course in college.

MATHEMATICS WHAT COUNTS

The analysis revealed significant differences between high school and college mathematics tests. These differences fell along three dimensions:

- *Topics Covered.* The high school tests generally addressed a broad range of topics, including Data, Probability and Statistics (DPS), but rarely extended past Algebra 1 and Geometry. The college placement tests, on the other hand, put a heavy emphasis on Algebra 2 and beyond, while DPS is nearly absent. College admissions examinations fall in between.
- *Presentation.* A significant proportion of mathematics problems on the high school tests are presented in verbal contexts. College-entry and placement examinations on the other hand, show a marked preference for numeric, symbolic and graphical presentation.
- *Demands on test-takers.* The college admissions tests demand far greater speed and facility with mathematics than the high school tests do, even when they address similar topics.

TOPICS COVERED

What we call the "Algebra 2 gap" is perhaps the most profound, since, at present, this knowledge is the gateway to college-level work. The chart on page 27 shows the distribution of topics on the tests analyzed (see Table A: Distribution of Topics on Standardized Assessments). As the table shows, the nationally available high school tests and TAAS do not address any mathematics at the level of Algebra 2 or above. The placement tests by contrast, contain extensive Algebra 2 questions and some trigonometry and pre-calculus. Indeed, the typical college or university appears to require students to score beyond Algebra 2 to enter credit level mathematics courses.[19]

Interestingly, the college admissions tests don't go that far: the SAT has only a few Algebra 2 items; the ACT somewhat more. These tests seem to require students to demonstrate mathematical insight on relatively basic material. The better state high school assessments, notably Kentucky's CATS and the Massachusetts MCAS incorporate topics from Algebra 2 and beyond. However, the emphasis is not nearly so great on any of these examinations as students will encounter on the placement tests.

Table A. Distribution of Topics on Standardized Assessments

	Algebra 1	Geometry	Algebra 2	Trig/precal	Alg 2+Trig	D.P.S.	Number[1]
TerraNova	14%	29%	0	0	0	23%	21%
Stan 9 m/c	29%	25%	0	0	0	25%	21%
KY CATS	9%	33%	20%	0	20%	17%	18%
MCAS 10	23%	28%	13%	5%	18%	13%	18%
New York	29%	26%	9%	3%	10%	9%	26%
TAAS	12%	23%	0	0	0	3%	53%
SAT I	47%	23%	3%	0	3%	3%	23%
ACT	25%	27%	12%	8%	20%	5%	18%
COMPASS	14%	23%	25%	15%	40%	0	19%
ACCUP al	25%	0	75%	0	75%	0	0
ACCUP cl	16%	0	63%	21%	84%	0	0

[1] "Number" includes number and number theory, arithmetic, combinatorics, and logic.

While the Algebra 2 gap has immediate consequences for students, the differences in data, probability and statistics send conflicting messages about what it means to be mathematically literate. The proportion of DPS items is highest on the high school examinations—as high as 25%—but drops off with each level of testing to the point that DPS does not appear at all on the placement examinations. Given the importance of this domain to further academic study, particularly in the sciences and social sciences, this omission from the college admissions and placement tests seemed shortsighted.

PRESENTATION

There is a noticeable discrepancy between the high school assessments and the college entry and placement tests regarding the presentation of items. The high school tests typically stress verbally presented problems that offered a story line or context for using mathematics. These verbal problems are intended to give test-takers the chance to apply their mathematical understanding in realistic situations. However, the contexts were often contrived, and they tended to require fairly basic arithmetic to solve.

The tests used for college admissions and placement, on the other hand, generally favored problems presented in numeric, graphic or symbolic form. These also typically addressed more sophisticated mathematical concepts than the verbally presented items.

This pattern seemed to hold up among the tests we examined: verbally presented problems tended toward low-level mathematics, and the numeric/graphic/symbolic problems generally addressed higher level concepts. It's possible that the test publishers are responding to research suggesting that students tend to have greater difficulty solving verbal problems regardless of the mathematics embedded in them. But clearly there could be a different and better balanced mix.

DEMANDS ON STUDENTS

The third discrepancy between tests is the different demands they place on the test-taker. This difference is particularly pronounced between the high school examinations and the college entry tests. Both of these groups of tests place considerable emphasis on Geometry and elementary Algebra items. However, the high school items tend to be simple, often addressing procedures that are learned in middle school. One of our reviewers observed that the Algebra concepts on the TerraNova, for example, tended to be those taught in the first quarter of the course, also true of geometry. The college entry tests, however, demanded more experience and sophistication with these concepts. Even though the questions were not quite at the level

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The Tests of General Educational Development (GED)

Students drop out of high school for a number of reasons—discouragement at continued poor performance, economic pressures, boredom. For these students, there is a second chance to gain a diploma—the Tests of General Educational Development (GED) developed by the American Council on Education (ACE).

The English language arts GED divides into writing and reading. The writing test includes a writing sample of 200 words to be written in 45 minutes, in response to a prompt that, like most of the tests, was typically purposeless: "There are four ways to get news: from a friend, TV, newspaper, and radio. Explain which source you like best and give reasons for your choice."

The reading test is considerably more interesting, since it presents the student with passages from Eudora Welty, Herbert Gardner, John Knowles, The Washington Post, and Newsweek. The reading level was tenth grade at the highest, with some complex questions about the general tone of the passage and about relationships within and outside the text. Because of its authentic reading passages, the GED is to be preferred over the Stanford 9 and TerraNova, although it does not attain the level of the best state tests.

In the mathematics test, most arithmetic items (a large proportion of the test) are presented verbally in terms of real-world applications, although many of these are contrived. The algebra and geometry items are basic, no higher than early high school courses. The level is about that of Stanford 9. Many of the items require some thought, although not as many as in the Massachusetts MCAS test, which was remarkable for the thoughtfulness of its mathematics.

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of Algebra 2, they covered concepts from the latter part of Algebra 1 (see examples on pages 16-17). The SAT I was particularly noteworthy for its questions that set up puzzle-like situations, such as scenarios with invented symbols; questions like these can only be answered through reasoning.

Another important feature of the college entry tests is that the test-taker has to be able to answer the questions easily and quickly. This probably explains why students perform better who have had higher level mathematics courses, even though that specific content does not appear on the test. As Lynn Steen wrote: "Issues of 'complexity' and 'kind' depend on the educational level of the student since one grade's 'problemsolving' becomes the next year's 'procedure'." While knowledge of Algebra 1 and Geometry might enable students to answer individual test items, students also need sufficient facility and speed with the concepts to get through the timed tests.

While the difference in topics was the most apparent area of discrepancy in mathematics, the tests were also misaligned in regard to presentation and demands. New assessments developed for Massachusetts, New York and Kentucky come closest to bridging the topic and presentation gaps. These tests are new. But they bear watching in the future for their potential to meet the needs of both schools and colleges, and send more coherent messages to teachers and students.

We have mapped a journey of false trails, wrong turns, and bumps in the road. Students and teachers are caught between aspects of the system which not only don't talk to each other as much as they should, but also don't examine their own assumptions and practices.

As we have seen, there are a couple of notable exceptions where states have used tests as tools to raise the standards almost to the point where they could bridge students into postsecondary education and high performance work. These are models to be emulated. Such state tests send a unified message both to teachers and students—this is what must be studied and attained for success. These tests prove that the road can be marked so that the runners, free of anxiety about obstacles, can make the race.

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Actions for Communities and States

As state and local education leaders turn their attention to rethinking the standards for high school graduation, they have an unprecedented opportunity to make all this standards stuff really mean something for students and promote both excellence and equity. But this can occur only with joint action by K-12 and higher education.

Recommendation 1. Take the wraps off current requirements.

One of the biggest problems is that the folks who are most important in the teaching and learning equation—high school teachers and students—often do not know about the differences between what higher education demands, in terms of both courses and test content, and what K-12 requires for a diploma. The wraps need to come off. Everybody in every community needs clear information on both course requirements and the content of each relevant test. Many states already share some of this information widely; some, like California, go so far as to publish and distribute detailed lists of the exact skills and knowledge that are expected of entering freshmen. However, which items from these lists will be emphasized on the admissions and placements tests is often a mystery. Yet the tests are often what matters most. All of the tests should be made public and shared widely.

Recommendation 2. All high school students should be required to complete a rigorous, college-preparatory academic core.

In recent years, states have been increasing their course requirements for high school graduation. But while students are now taking more math, more English and more science, they are often not taking the *right* courses—courses that will equip them with the knowledge and skills that they need for college and for decent jobs.

There are two parts to making this happen:

- First, higher education needs to get clear on what it needs: not simply what it wants, but what students really need to be successful in general education. The point here is not that K-12 should simply defer to whatever is on this list, but to create, as the University of Maryland's Don Langenberg often says, a kind of "creative tension" between the two systems that will help both clarify expectations and ratchet them higher over time.
- Then, together higher ed and K-12 need to provide those courses and the training that teachers will need to be successful with all students. These changes need to be reinforced by parallel changes in accountability systems and high school graduation requirements.

Some will argue that there is no room in the high school curriculum for these changes. We beg to differ. As courses like Algebra I move down into middle school, it's hard to argue that in four years of high school we can't get all students through two more years of college preparatory math. As things are, American young people make surprisingly modest gains in achievement over their high school years.[20] By requiring all students to complete rigorous college preparatory classes instead of just any old class that fills an open slot, schools can stretch student minds—and stretch their results.

Recommendation 3. Eliminate redundancies and mixed messages in assessments at the juncture of high school and college

There are at least four ways that higher education and K-12 leaders can move forward on the problems in assessment.

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Option A: K-12 system adopts assessment measuring the skills and knowledge that students need to succeed in college.

Two states, New York and Massachusetts, seem to have adopted assessments that measure the reading and writing skills that colleges say they need, and come close to closing the mathematics gap as well. Maryland and Florida have pledged to do the same thing, although their exams are not yet in place. In cases like these, state higher education institutions can probably use the results of these examinations in the admissions and/or placement process with at least as much confidence as they use current admissions and placement tests. (This doesn't mean that the cut scores for high school graduation and college admission need to be the same, at least initially. The point is aligned content.)

Such use would undoubtedly increase the importance of the K-12 exams for teachers, parents, and, especially, students. Indeed, it may be the only way that states have—short of denying a diploma—that will get students to take these exams seriously and work hard to pass them.

Option B: Higher education system uses K-12 assessment for admission and/or placement, even if that exam does not measure some domains considered important for college

Recent research in West Virginia seems to suggest that students who achieve at a reasonably high level on the state K-12 assessment succeed in college, even though the K-12 assessment decidedly does not measure the knowledge and skills the colleges say they need. Other states may want to study the predictive validity of their K-12 assessment for success in the first year in college. They, too, may find that their exams have at least the same predictive value as the SAT or ACT and, therefore, save students and families some money.

Texas may, in fact, do just that. The Texas Legislature has just mandated the development of a new eleventh grade assessment that will be much more rigorous than the current high school exit exam. It will include Algebra and Geometry, but it may stop short of assessing some of the content normally covered in college placement tests. At the direction of the Legislature, however, the new examination will be used in the admissions/placement process.

Option C: K-12 uses higher education assessment

In Oregon, the higher education system has developed a performance-based admissions standards system (PASS) that is currently being put into place. Because this system is scored and administered by high school teachers, it is beginning to drive practice in K-12. The K-12 system could accelerate that progress by adopting all or part of the PASS system for high school graduation.

Option D: Students admitted and placed based on whichever assessment yields best performance

Some years ago, the University of Wisconsin System authorized an admissions experiment designed to allow certain progressive high schools to present their graduates' credentials for admission in non-traditional ways. To assure that students from these high schools were not penalized, they could be admitted based either on a proficiency-based system or on the traditional basis. Then, over the course of the next several years, the system tracked the performance of these students, focusing especially on those admitted one way who would not have been admitted the other way. It turned out that students admitted on the non-traditional criteria did at least as well as students admitted in the normal ways.

Where the leadership in a state is unsure of which approach to take, students could be given the choice of credentials to present: performance on the K-12 assessment or performance on the normal college admissions and/or placement exams. Over time, research could provide some answers as to which of these approaches produces the best results.

Recommendation 4: Reward high-performing students by enabling them to begin college work early; provide extra time and help for high-school students who are struggling.

Over the last decade, college-level courses—Advanced Placement, IB, and the like—have been the fastest growing part of the high school curriculum. At the same time, the biggest growth in the college curriculum has been in high school-level courses!

This doesn't make any sense. With a coherent system of standards-based assessments, we could reorganize

ourselves to do both of the things that common sense would seem to suggest: enable high school age students to begin real college work whenever they are ready, and provide intensive, focused assistance for those who need extra time and extra help to reach high standards.

Other Steps?

Lessons from states moving ahead with the K-16 alignment work should prove instructive for the rest of the country. Clearly, this isn't easy stuff. There's no cookie cutter to apply, no formula to follow. But for many students the current system is frustrating, confusing, and downright discouraging. This confusion dampens effort, no question about it. Surely we ought to see if we can straighten out the signals.

NOTES

[1] National Center for Education Statistics, *Condition of Education 1997, p. 64.* Attending within two years of high school graduation.

[2] Extrapolation based on immediate college-going rate data in Mortenson "College Continuation Rates for 1998 High School Graduates"; *Postsecondary Education Opportunity (June, 1999)* and two-year college-going rate data from the National Longitudinal Studies.

[3] Adelman, Clifford *Answers in the Tool Box.* US Department of Education; June, 1999.

[4] Mortenson, "Freshman-to-Sophomore Persistence Rates by Institutional Control, Academic Selectivity and Degree Level, 1983 to 1998," *Postsecondary Education Opportunity,* Number 74 (Oskaloosa IA: The Mortenson Research Seminar on Public Policy Analysis of Opportunity for Postsecondary Education, August 1998)

[5] National Collegiate Athletic Association, *1997 NCAA Divisions I and II Enrollment and Persistence Rates Report* (Overland Park, Kansas: NCAA, 1997).

[6] See, for example, Standards Mean Business (National Alliance of Business) and Formula for Success (Business Coalition for Education Reform).

[7] National Commission on Excellence in Education, *A Nation At Risk,* U.S. Department of Education, Washington D.C., 1983, p. 24

[8] from the 1999 Action Statement adopted October 1, 1999.

[9] Report from the Project to Assess and Improve Practices for Writing Assessment across Public Higher Education to the Massachusetts Board of Education, 1999

[10] For more information on examinations in other countries, see Barton, Paul "Too Much Testing of the Wrong Kind; Too Little of the Right Kind in K-12 Education", ETS, (1999); Eckstein, Max and Harold J. Noah *Secondary School Examinations International Perspectives on Policies and Practices (*Yale University Press); Stevenson, Harold and Shin-ying Lee, *International Comparisons of Entrance and Exit Examinations (*1997).

[11] According to Clifford Adelman in *Answers in the Tool Box,* only 18% of college students requiring three or more remedial courses and 9% of college students requiring more than two semesters of remedial reading manage to complete a baccalaureate degree, compared with 54% of students requiring no remediation and 45% of those requiring only one remedial course.

[12] Adelman, Cliff op cit

[13] In New York state, for example, students who need remediation at the City University of New York will be prevented from entering CUNY's four-year campuses beginning in fall 2000. Similarly, remedial students in the California State University System will be precluded from returning to campus if they can't complete all required remediation within one year of entry.

[14] complete descriptions of all these tests and the team's analysis of their qualities will be found on the Education Trust website: www.edtrust.org

[15] only the Level A Regents' examinations was analyzed for this study. An optional "Level B" will be available for students in the 1999-2000 academic year which will address higher mathematics content. English language arts has one level only.

[16] The College Board, "Taking the SAT II: Subject Tests,1997-98," College Entrance Examination Board and Educational Testing Service, 1997. p. 11

[17] There is no reason why impromptu writing has to be without purpose and audience: the prompt could ask students to write a letter or a newspaper editorial persuading readers to support a proposed ordinance affecting their town or their school, for example.

[18] The University of California Subject A examination is a good example of a writing placement test that focuses on the kind and level of writing required in college. Another example comes from Temple University in Philadelphia. Entering first-year students at Temple are given a sheet of paper about four weeks ahead of the examination date, containing four passages from textbooks or high-level journalism, each proposing a theory or explanation to major problems of society. The students are told to study these passages and to make notes on the sheet of paper. When they arrive for the examination, they may bring the sheet of paper with the notes. They are given two of the passages, from which they must choose one, and are asked to a) summarize the argument, and b) respond to it with a reasoned argument of their own. Clearly this writing assessment provides information on the student's reading proficiency; ability to summarize; and ability to produce the kind of writing needed in college.

[19] according to an unpublished paper by the Education Trust ("College Placement Test in Mathematics: A Report to the California State University" June 1999), "most [placement tests] require students to demonstrate substantial mastery of the mathematics normally taught in Algebra 2 in order to gain exemption from remedial mathematics."

[20] National Center for Education Statistics, *Reading and Mathematics Achievement: Growth in High School.* Issue Brief, December 1997.

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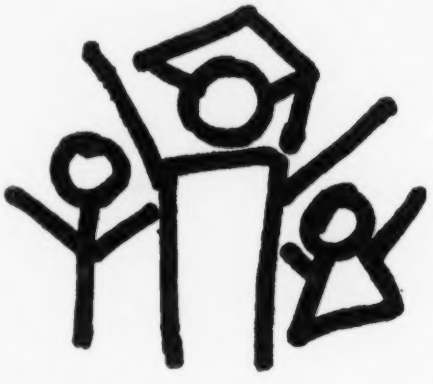

Upcoming Events

Local K-16 Council Leaders'
Winter Meeting
March 2000
Reno, Nevada

NASH State K-16 Systems' Meeting
July 2000
To Be Announced